



APPENDIX

IN THE UNITED STATES PATENT OFFICE

In re Application of: WHINNERY, Jr. et al.)

Serial Number: 10/652,647)

Examiner: COONEY, J.M.

Filed: 08/28/03)

Group Art Unit: 1711

For: **HIGH STRENGTH FOAM**)

TOOL AND METHOD

Attorney Docket Number: SD-8466)

AFFIDAVIT UNDER C.F.R. §1.132

[illegible]

LEROY L. WHINNERY, JR., being duly sworn, does hereby depose and say as follows:

That he received a Bachelors of Science degree in chemistry from Ithaca College in 1985 and that he received a Doctors of Philosophy degree from the California Institute of Technology in 1990 under the direction of John E. Bercaw, Ph.D., Centennial Professor of Chemistry;

That his graduate dissertation focused on the mechanistic and synthetic organometallic chemistry;

That he has been employed by Sandia National Laboratories in Livermore, California, since 1990; that he has worked in a number of diverse projects including cryocycling as a propellant size reduction technology, polymeric precursors to ceramics, engineering porosity into materials, uniform density monoliths from expandable microspheres, conducting

polymers for microactuator applications, plastic scintillators, getters for a variety of applications and microsystems and desiccants;

That he was the recipient of R&D 100 Awards in 2001 for Polymeric Hydrogen Getters and 2005 for TEPIC: A High-Temperature and High-Strength Material for Composite Tooling;

That he has had 12 patents issued in his name covering polymeric hydrogen getters, uniformly dense polymeric bodies, a triboluminescent sensor, thionyl chloride getters, porous silicon carbide, materials for immobilized beds, ozone decomposing filters, porous sintered bodies, triboluminescent elastomeric materials and castable 3-D stationary phase for electric field driven applications and several pending; and

That his current work includes formulating and processing new rigid, water-blown polyurethane and polyisocyanurate foams for use as encapsulating materials as well as for structural supports, and that he conducted and supervised a series of concurrent tests in order to determine, evaluate and compare the catalytic activity of the following amine compounds on water blown polyisocyanurate foams:

- I. DABCO TMR-3 (Air Products Inc., proprietary acid blocked amine)
- II. DABCO TMR-30 (2,4,6-Tris(Dimethylaminomethyl)phenol)
- III. POLYCAT 8 (N,N-Dimethylcyclohexylamine)
- IV. DABCO TMR-30 + POLYCAT 8
- V. DABCO TMR-30 + DABCO 33 LV (33% triethylenediamine in dipropylene glycol)

That the catalyzing activity of compounds I through V was determined by the following procedure:

A quantity of an isocyanurate resin was added to a quantity of a surfactant in a ratio of about 8:1 and mixed. A quantity of an epoxy resin was then added to the isocyanurate/surfactant mixture in a ratio of about 3:5 and mixed. A small amount of water (~0.5 – 1%) was added to the isocyanurate/surfactant/epoxy mixture, mixed and a small

quantity (~0.5%) of the amine catalyst was added to the mixture, mixed, immediately poured into a second vessel, and allowed to stand undisturbed as the foaming reaction proceeded.

Deponent further states that his observations were terminated after the reaction ceased, at which time the results were recorded. The relative value of the speed and quality of the polymerization reaction initiated by each of the catalyst compounds when mixed with the isocyanurate/surfactant/epoxy mixture and water was indicated by a number value as follows:

1. Rapid Incomplete Reaction
2. Delayed Incomplete Reaction
3. Moderate Complete Reaction

Deponent further states that the results of said test were as hereinafter presented in **TABLE 1** below:

TABLE 1

TEST	CATALYST				
	I	II	III	IV	V
A	1	---	---	---	---
B	2	---	---	---	---
C	---	1	---	---	---
D	---	---	1	---	---
E	---	---	---	3	---
F	---	---	---	---	3

Deponent further states that the test data presented in **TABLE 1** demonstrates the following:

- (1) that compounds **I, II and III** all exhibited rapid reaction resulting in partial and/or inhomogeneous polymerization of the resins;
- (2) that compounds **IV and V** exhibited a slower reaction resulting in acceptable polymerization.

Deponent further states that while other isocyanate trimerization agents were investigated none could be found that would yield both an acceptable end product and also exhibit acceptable processing characteristics, and that with the exception of TMR-30 none of the other catalysts were stable in the presence of water.

Further deponent sayeth not.

LeRoy L. Whinnery, Jr.
LeRoy L. Whinnery, Jr.

Signed at Livermore, California, this 12 day of May, 2006.

On _____, 200____, before me, _____, a Notary Public, **LeRoy L. WHINNERY, Jr.** personally appeared before me and proved to me on the basis of satisfactory evidence to be the person whose name is subscribed to the within instrument and did acknowledged to me that he executed the same in his authorized individual capacity, and that by the signature on the instrument the person, or entity upon behalf of which the person acted, executed the instrument.

WITNESS my hand and official seal.

SPK Attached.
Notary Public
My Commission Expires:

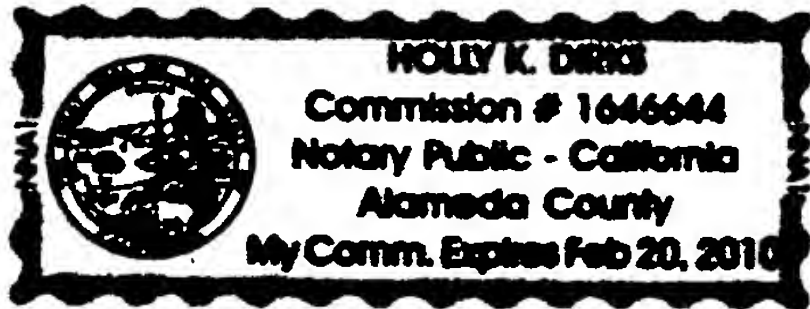
(SEAL)

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

State of California

County of Alameda } ss.

On May 12, 2006, before me, Holly K. Dirks,
personally appeared Leroy Louis Whinnery,
Name and Title of Officer (e.g., "Jane Doe, Notary Public")
Name(s) of Signer(s)



Place Notary Seal Above

☐ personally known to me

☒ proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

WITNESS my hand and official seal.

Holly K. Dirks
Signature of Notary Public

OPTIONAL

Though the information below is not required by law, it may prove valuable to persons relying on the document and could prevent fraudulent removal and reattachment of this form to another document.

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